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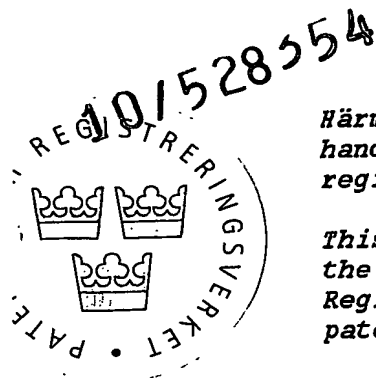
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AN ADJUSTMENT DEVICE FOR AN OVER-CENTRE FASTENER

The present invention concerns an adjustment device for an over-centre fastener as stated in the pre-amble of claim 1.

Over-centre fasteners (also denominated toggle fasteners or latches) are commonly used for securing - and often clamping - two objects together, such as keeping a lid in a closed position on a box or case. A first part of the fastener, referred to as a striker and often having a hook-like shape, is attached to one of the objects. A base member of the other part of the fastener is attached to the other object.

There are two different types of over-centre fasteners.

In a first type (see: <http://www.ojop.com/700.htm>), a first end of a lever is jointed to the base member so as to be swingable about a first axis. The other end of the lever serves as a handle member. At a distance from the first end, an engagement means is linked to the lever so as to be swingable about a second axis parallel to the first axis. In use, the engagement means is brought into engagement with the first part of the fastener and the handle with the second axis is swung about the first axis to move the engagement means closer to the base member. In order to vary the distance between the second axis and the engagement means, and thereby the engagement force, the engagement means has a threaded stem member engaged in the threads of an internally threaded body member rotatably connected to the lever about the second axis. The body member is normally a cylindrical body rotatable about its axis.

In a second type, (see: <http://www.ojop.com/900.htm>) of over-centre fastener, a first end of a link is jointed to the base member so as to be rotatable about a first axis. A second end

of the link is jointed to a first end of a handle member. A second end of the handle member is provided with engagement means for engagement with the first part of the fastener. In use, the engagement means is brought into engagement with the first part of the fastener, and the handle member is operated, involving rotation of the second axis about the first one, thereby moving the engagement means closer to the first part. In order to vary the distance between the first and the second axes, the length of the link is variable in that it comprises a threaded stem member engaged in an internally threaded body member connected to the handle and containing the second axis. In this case, the body member is usually formed from folded sheet metal.

In both types of fasteners, there is a desire to prevent undesired relative rotation of the two threaded members. This has previously been done by providing a separate block of a suitable synthetic material having a hole therein threaded in conformity with the threads of the stem member and the internal threads of the body member. In use, the threaded stem member extends through the threads of both the body member and the separate block, the latter having material properties restraining relative rotation of the threaded stem member.

Apart from providing a threaded hole in the body member, this state of art arrangement requires supply of the separate block, threading a hole therein, and mounting thereof. In order to save material and labour costs as well as time, the present invention proposes the use of a conventional lock nut as a means for transmitting forces and restraining rotation.

In the first type of fastener, it is sufficient to cut a rectangular aperture through the body member extending at right angle to its rotational axis and at the same time at

right angle to its through hole, which is no longer threaded but a smooth hole having an internal diameter slightly larger than the external diameter of the thread of the threaded stem member. The dimensions of the aperture are such that the nut is unrotationally accommodated within it.

In the second type of fastener, there is provided a holder for the nut connected to the handle member to be rotatable about the second axis. The holder is formed from sheet metal to receive the nut in an unrotational manner.

The invention will now be described reference being made to the accompanying drawings, wherein:

Fig. 1 is a side view of a state of art fastener of the first type;

Fig. 2 is a plan view of the fastener of Fig. 1 shown without its associated striker;

Fig. 3 is a plan view corresponding to Fig. 2 of a fastener provided with a lock nut according to the present invention;

Fig. 4 is a part cross sectional side view of a fastener of the second type provided with a lock nut according to the present invention and shown in a partially open position;

Fig. 5 is a cross sectional side view of the fastener of Fig. 4 in a locked position; and

Fig. 6 is a plan sectional view taken along line VI-VI in Fig. 5.

The state of art fastener shown in Figs. 1 and 2 is shown to connect and clamp together two separate pieces 11 and 12. It includes a first part 13 - a striker - fixed to the first piece 11, and a second part 14 fixed to the second piece 12.

5 The striker has a hook-like free end 13a. The second part comprises a base plate 15 fixed to the second piece 12, a lever 16 and an engagement member 17. The lever 16 is swingable about rivets 18a, 18b engaged in spaced brackets 15a, 15b protruding from the base plate 15. A first end 17a of
10 the engagement member 17 is threaded and engages internal threads of a cylindrical body 19 which is linked to the lever 16 at a distance from the rivets 18a, 18b. More precisely, the cylindrical body 19 is carried between spaced legs 16a, 16b of the lever 16 so as to be rotational about stub shafts 21
15 engaged in the spaced legs. A free end of the engagement member 17 is formed with an eye 17b engaging the hook-like end 13a of the striker 13 in the locked position shown in Fig. 1.

In the unclamped state of the engagement member, its threaded end is likely to disengage from the threads of the body 19 due
20 to, for instance, vibrations. To overcome this risk, the present invention proposes to use a conventional lock nut, for instance of the kind having a friction increasing inlay at one end of its internal threads.

Fig. 3 shows how this may be realized in a fastener of the kind shown in Figs. 1 and 2. A rectangular aperture 22 is
25 machined through the cylindrical body 19' and a lock nut 23, having a width between two of its opposed sides 23a, 23b slightly greater than the free width of the aperture 22, is introduced into the aperture. Thereafter, the threaded end 17a
30 of the engagement member is threaded through the nut and a friction increasing inlay 24 provided at one of its ends. The internal threads of the cylindrical block may be maintained,

although it is preferred not to have such threads in this case, since they may interfere with the threads of the nut when mounting the threaded end of the engagement member.

5 The inventive idea applied to the second type of fastener is shown in Figs. 4 - 6, wherein the same reference numerals are used as in Figs. 1 - 3 for corresponding parts.

As in the previous embodiment, a first piece 11 is to be clamped to a second piece 12 (Figs. 4 and 5) by means of a fastener. The fastener is shown in Fig. 4 to be in a partly
10 open state and in Fig. 5 to be closed, having clamped the two pieces together. A striker 13' is attached to the first piece 11 and a base plate 15 is attached to the second piece 12. Again, the base plate has spaced brackets 15a, 15b. A cylindrical body 25 is rotatably carried between the brackets
15 by means of stub shafts 26a, 26b engaged in a respective bracket. A stem 27 having threads 27a at one end has a reduced diameter opposed end 27b extending through a diametrically extending hole 28 through the cylindrical body 25. The stem end 27b is jolted at 29 so as to firmly keep the stem in
20 relation to the hole 28 and the cylindrical body.

A handle member 30 of inverted U-shaped cross section has spaced flange portions 30a, 30b and a hooked forward end 30c for engagement with the striker 13'.

25 A bent sheet metal structure 31 has a generally inverted U-shaped portion including opposed flange portions 31a, 31b and a web portion 31c. The flange portions are linked to a respective flange portion 30a, 30b of the handle member 30 by means of rivets 32a, 32b, respectively. The web portion 31c carries an integral extension 33. A first portion 33a of the
30 extension is bent at substantially 90° so as to extend along and abut a respective forwardly directed edge 34 of the flange

portions 30a, 30b. A second portion 33b of the extension is bent at 90° in relation to the first portion, and a third portion 33c thereof is further bent at 90° in relation to the second one. Flap portions 33f originally extending in opposite directions from the third portion are bent towards the first portion 33a so as to be mutually parallel, thus forming a nut retaining pocket 35. The distance between the flap portions 33f is slightly greater than the width between opposed surfaces 23a, 23b of a lock nut 23 received within the pocket 35 so as to unrotationally keep the nut therein. Holes 36, 37 for the threaded portion 27a of the stem 27 are provided in the third and first portions 33c, 33a of the extension 33.

It will be realized that in operation of the fastener, the extension 33, and particularly its third portion 33c with its flap portions 33f, will be exposed to only minor stresses keeping the nut unrotational, whereas the clamping forces will be transferred from the stem 27 through the nut and into the first portion 33a of the extension, which abuts the edges 34, thus directing the clamping forces into the opposed flanges of the structure 31.

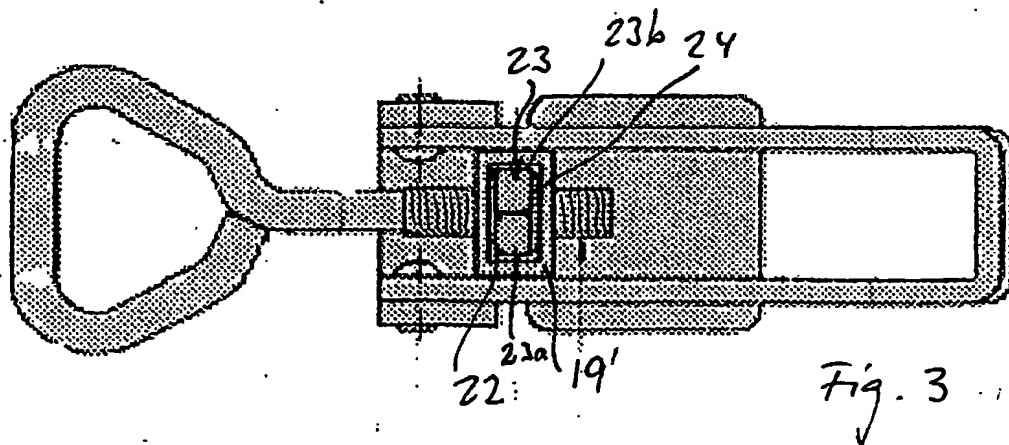
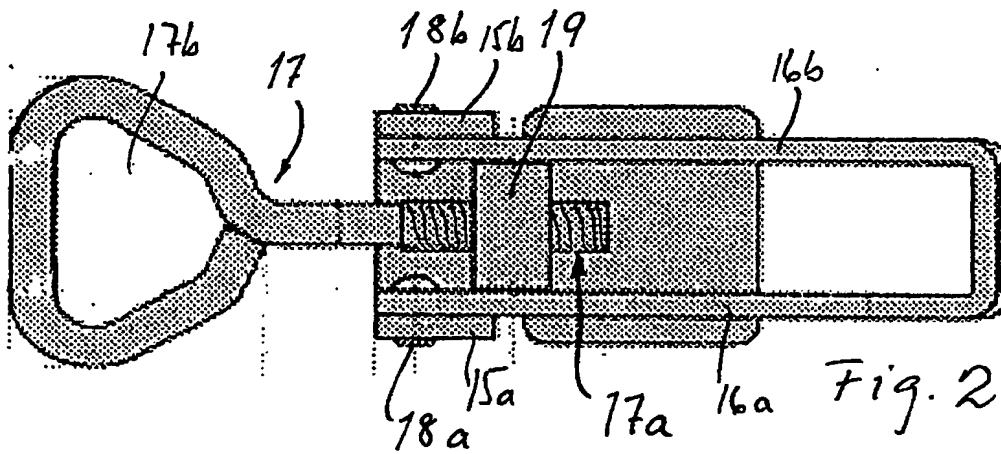
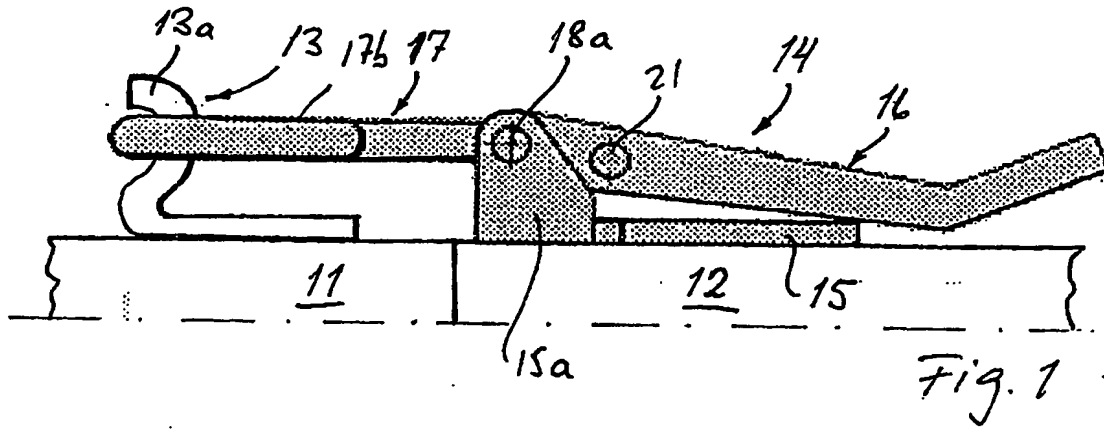
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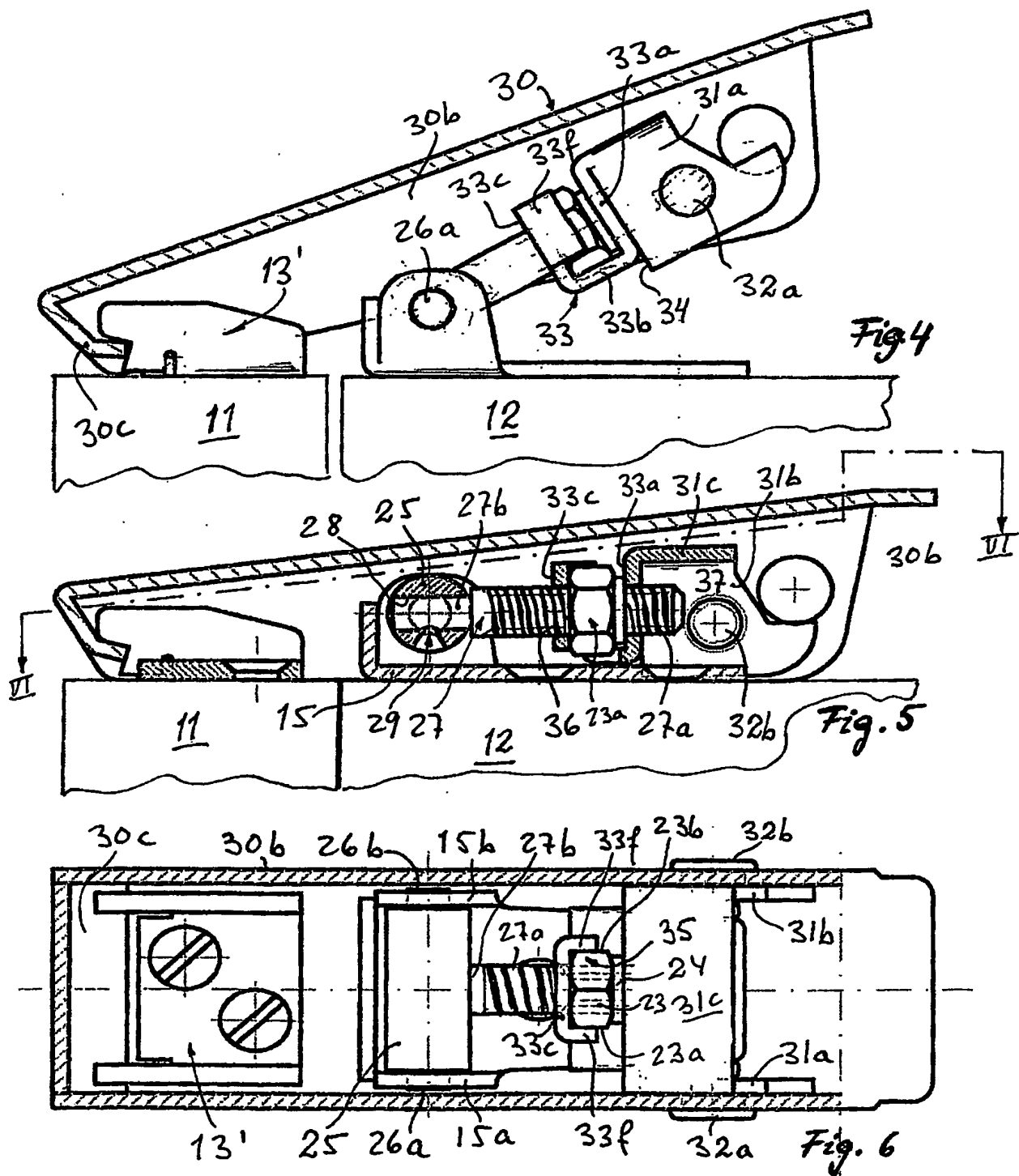
1. An adjustment device for an over-centre fastener for securing and clamping two parts (11, 12) together by applying a pulling force between said parts by means of a lever (14; 30), said adjustment device including a male threaded member (17a; 27a) and a female threaded member (19), c h a r a c -
5 t e r i z e d i n that the female threaded member is a conventional lock nut (23) unrotationally held by a structure (19'; 31, 32) movable with the lever (14; 30).
- 10 2. The device according to claim 1, c h a r a c t e r - i z e d i n that the structure movable with said lever is a block (19') having an aperture (22) therethrough receiving said lock nut in an unrotational manner.
- 15 3. The device according to claim 1, c h a r a c t e r i - z e d i n that the structure movable with said lever is shaped with a pocket (35) unrotationally holding said lock nut (23).
- 20 4. The device according to claim 3, c h a r a c t e r - i z e d i n that said structure is formed from sheet metal and includes two opposed flaps (33f) preventing rotation of said lock nut.

ABSTRACT

An adjustment device for an over-centre fastener for securing and clamping two parts (11, 12) together by applying a pulling force between said parts by means of a lever (30). The adjustment device includes a male threaded member (27a) and a female threaded member (19). The female threaded member is a conventional lock nut (23) unrotationally held by a structure (31, 32) movable with the lever (30).

Fig. 4





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